[redacted]

Illinois Mathematics and Science Academy
1500 Sullivan Road
Aurora, IL 60506-1000

Application For SIR Placement at Fermi National Accelerator Laboratory (FNAL)

(provide two recommendations – see rec form; please use a computer to complete this application legibly)

Name: Vacha (Last) Colette (First) Elisabeth (Middle) Date: 2/4/2015 (month / day / year)

Home Address: 54 Old Creek Rd (Number and Street)

Palos Park (City) IL (State) 60464 (Zip Code) Home Telephone: (708) 465-5467 (include area code)

Person to be notified in an emergency: Jill Colby

Telephone (office hours): (708) 923-0896 (include area code) Telephone (other hours): (708) 923-0896 (include area code)

Student Cell Phone: (708) 465-5467 Year of Graduation: 2017

Suggested FNAL Advisor:

Gender: ☐ male ■ female Age: 16 Country of Citizenship*: United States

*Citizens other than from the United States must complete the following information:

Permanent Resident: ☐ Yes ☐ No

Place of Birth: (City, State, Country)

Passport No.: Expiration Date:

All non-U.S. citizens must present their original, unexpired foreign passport on the first day of the program. Photocopies are not acceptable. Depending on your circumstances, you also must present:

- Form I-94 Arrival Departure Card that shows lawful admission to the U.S. and the end date of your "authorized stay", **PLUS**:
  - Form I-797 Notice of Action approving H-4, O-3, TD, E-3 or other nonimmigrant (temporary) visa status in the U.S. , OR
  - Form DS-2019 Certificate of Eligibility for J-2 status, OR
  - Form I-20 showing F-2 status, **OR**
- Greencard (Alien Registration Card, or I-551 Card) showing grant of lawful permanent resident status.

Describe your skills, abilities, proficiencies; please be honest.

Highest Math Level/Skill: Trigonometry, logarithms, functions, algebra

Skill with Statistics: Basic descriptive and inferential statistics (correlative, t-test)

Science Classes: Biology, Chemistry, Physics

Describe Your Laboratory Skills: I am careful and precise when measuring. I pay close attention to lab safety. I know how to use different sensors in labs. I have used items such as an analytical balance.

Prior Research (SIR) Experience (include advisor name/location): none

Computer Proficiency: Please indicate your skill level for each of the below.

	none	introductory	intermediate	advanced
Basic	X			
C/C++	X			
Fortran	X			
Java	X			
Other Languages(list)	X			
Mathematica		X		
Matlab	X			
Other Programs (list)	X			
Unix(Linux)	X			
Windows			X	
Mac			X	
Other OS (list)	X			

Rank Your Interests (Do not rank any area that you would not be willing to pursue an investigation in.)

___Accelerator Component Testing, Theory and Design
_1_ Astrophysics Data Analysis, Detector Development, Theory
___Computer Networking, Computing for Analysis, Data Analysis of Experiments, Computer Simulation and Modeling
___Detector Design and Testing
___Electronics Design and Testing
___Instrumentation and Diagnostics
___Radiofrequency (RF) Systems
___Magnet Systems
___Mechanical Design and Development
___Particle Physics Phenomenology
___Particle Physics Theory
___Superconducting Technology

Attach an application that includes the following items:

- Academic honors and awards that you have received. Please limit to ten or less honors/awards that you feel are the most significant.
- Extracurricular activities, interests, and any leadership role(s). Please limit to ten or less activities/interests that you feel are the most significant.
- Explain why research at FNAL would be a benefit to you and what you expect from participation in an investigation at FNAL. (Limit your answer to 250 words or less.)
- What would you tell a FNAL scientist about yourself so that you would be selected to work with her or him? (Limit your answer to 250 words or less.)
- Explain one exceptional experience you had with STEM in the last year. (Limit your answer to 250 words or less.)

Placement at FNAL also requires:

- Fermilab Visitor ID Form (form attached)
- Proof of Medical Coverage (form attached)
- Work Permit (required of students who are under 16 years of age)
- Documentation of Immigration Status (see first page)
- Authorization for Issuance of an ID Card (form attached)
- Student Registration (form attached)

- Note that some information is repeated on the attached forms, which will be filed with the appropriate offices at FNAL once a student has a specific placement.

I understand that by submitting this application for placement at the **Fermi National Accelerator Laboratory** *I may not apply for or seek other SIR opportunities until a decision has been made about this application. Placement for SIR at FNAL is not guaranteed by submission of this applicationn.*

Signature of Parent/Guardian — Date: 6.5.15

Signature of Applicant — Date: 6.5.15

Academic honors and awards that you have received. Please limit to ten or less honors/awards that you feel are the most significant.

a) 1st place in Mission Possible at regional Science Olympiad
b) 2nd place in Geologic Mapping at regional Science Olympiad
c) 4th place in Experimental Design at regional Science Olympiad
d) Director's Award for Band

Extracurricular activities, interests, and any leadership role(s). Please limit to ten or less activities/interests that you feel are the most significant.

a) Cross Country
b) Band; Concert Band President
c) Student Orchestra
d) IMSA Allies- teaching science to 4th-9th graders

Explain why research at FNAL would be a benefit to you and what you expect from participation in an investigation at FNAL. (Limit your answer to 250 words or less.)

I would like to have the experience of working in a real research lab. I want to learn more about astronomy and astrophysics as well as have a deeper understanding of the math and science that lies behind it. It would be interesting to me to learn more about the different machines and tools that are used when researching stars, nebulas, and other space bodies. The majority of the universe is currently physically unreachable to us and I feel that I would benefit from participating in an investigation that would explore anything in the field of astrophysics.

Through working at FNAL I would be able to gain a much deeper understanding of astrophysics. I would have the opportunity to learn about the specific characteristics of stars and galaxies which may only just have been discovered. I would also be able to learn more at FNAL than I could through any research I could do by myself. I would also be able to experience what it is to research and work in a laboratory, not just in a general way, but specifically as an astrophysicist.

What would you tell a FNAL scientist about yourself so that you would be selected to work with her or him? (Limit your answer to 250 words or less.)

I'm dedicated to the things I love. Give me work that I don't care about and I will put it off and dread working on it, but if you give me the opportunity to work on something that I enjoy and that is important to me I will prioritize it. Things that I care about end up being the things that I look forward to. I love stars. It fascinates me the way they're born and how they get to essentially live a life and die while not actually being alive. You can find stellar nurseries where stars are "born." Then at a point the death of a star creates a nebula. I find it interesting how the gravity of stars creates larger elements as they collapse in on themselves. If I get to participate about astronomy and astrophysics I will look forward to every Wednesday. I am the kind of person who will put all of my time into this kind of thing. If you give me the opportunity to do this I will dedicate as much time as I can towards this. I am persistent. I will try everything possible to figure something out and get it done; sometimes this ends up working well and I have a solid product, other times it ends up very sketchy and a bit questionable, but it does work.

Explain one exceptional experience you had with STEM in the last year. (Limit your answer to 250 words or less.)

I participated in the regional Science Olympiad competition at College of DuPage. My friend and I were in an event called Mission Possible with which the task was to build a system of energy transfers –chemical, electrical, mechanical, etc.– which would end with the goal specific to that particular year which was to light a light bulb. We started working on this event that December and it was a process. It started with a lot of ridiculous ideas since at that point we had no idea what we were going to do. We ended up spending a lot of time in the physics lab working on it. I had a study hall every other day and I spent them in that lab for three months. We got a working system by the first invitational, but it didn't work at the competition. The next two

invitationals were one and two months later. We spent the time leading up to each of the invitationals getting rid of the worst steps, adding new ones, and improving some old steps. My favorite step was towards the end where we set of a mouse trap that lit a match which lit a wick that had been soaked in alcohol which lit a strip of magnesium on fire. It never actually worked at any of the invitationals, but the work paid off when it went all the way through at regionals and we ended up getting first at the regional competition.

Student Name: VACHA, Colette Elisabeth
Date of Birth: 05/22/1999
Entry Date: 08/14/2014

Illinois Mathematics and Science Academy
School Code:140177

		Sem1	Sem2	Credit
Y14-15				
Grade 10	Literary Explorations I	B		0.50
Grade 10	Literary Explorations II		B-	0.50
Grade 10	Concert Band	A	A	1.00
Grade 10	American Studies	B	A-	1.00
Grade 10	Mathematical Investigations II	C+		0.50
Grade 10	Mathematical Investigations III		C+	0.50
Grade 10	Scientific Inquiries - Chemistry	B		0.50
Grade 10	Scientific Inquiries - Physics	C+		0.50
Grade 10	Scientific Inquiries - Biology		C	0.50
Grade 10	Methods in Scientific Inquiry		B	0.50
Grade 10	Moving and Learning	B	A	0.50
Grade 10	Russian I	A-	A-	1.00

Diane M Stegmayer

Registrar 06/10/2015

Academic Program
All IMSA courses are college preparatory.

Explanation of Grades

A	Exceeds course requirements
B	Meets course requirements
C	Needs improvement
D	Does not meet course requirements; no Academy credit awarded
I	Incomplete, course requirements not completed when grades were issued
WF	Withdrawn from course with failing grade; no Academy credit awarded
W	Withdrawn from course; no Academy credit awarded

Pass/Fail Options

P+	Exceeds course requirements (Pass with Distinction, used only in Independent Study and Student Inquiry and Research courses)
P	Meets course requirements; Academy credit may/may not be awarded depending on course grading criteria
F	Does not meet course requirements for course taken pass/fail; no Academy credit awarded

Intersession (one week non-credit course)

S	Satisfactory completion of requirements
U	Unsatisfactory completion of requirements

GPA/Class Ranking Policy
In light of IMSA's selective admission process and in order to promote collaborative exploration and discovery, the Academy does not compute grade point averages and class rankings.

Standardized Test Scores
Standardized test scores are provided by the student.

Student Inquiry and Research
(Inquiry and Mentorship) includes on-campus and off-campus experiences in which students plan, investigate, analyze, and communicate in-depth scholarly investigation, either guided or directed, by scientists, scholars, and/or educators.

TALENT (Total Applied Learning for Entrepreneurs)
Is a program that promotes entrepreneurial applied science and technology.

Federal and State Constitution Requirements
Are fulfilled with successful completion of American Studies.

Physical Education Requirement
Is fulfilled with successful completion (pass) of physical education or wellness.

Notice to persons or agencies receiving student records:
Section 438(b)(4)(B) of U.S. Public Law 93-380 requires that this pupil record information be transferred to you only on condition that you will not permit any other party to have access to it without the written consent of a parent/guardian or eligible student.

IMSA
Illinois Mathematics and Science Academy
1500 Sullivan Road
Aurora IL 60506
Phone 630-907-5066 Fax 630-907-5922

Illinois Mathematics and Science Academy

The World's Leading Teaching and Learning Laboratory for Imagination and Inquiry

Student Inquiry and Research
Recommendation Form

Student Name Colette Vacha graduation year 2017

Recommender Peter Dong pdong@imsa.edu
(name) (email)

Recommender: The student listed above wishes to participate in the Student Inquiry and Research (SIR) Program. SIR advisors are frequently requesting additional information so your assistance is needed in recommending and evaluating students. This completed form, as a pdf file, may be sent to off-campus individuals to assist with best placement of students.

1. Please rate the student on each of the following criteria, with 5 being highest and 1 being lowest, based on your experiences with IMSA students.

Criteria	5	4	3	2	1	No basis for judgment
Motivation for the investigation			X			
Intellectual potential		X				
Ability to analyze/problem solve		X				
Teamwork skills			X			
Perseverance			X			
Maturity			X			
Works independently			X			
Communication skills			X			
Integrity		X				
Overall judgment			X			

Please comment on the preparedness of the student to participate in an independent investigation.

Colette is generally responsible and gets the job done. I have not, however, observed a particularly strong interest or drive for her to understand the material in class, and while her work has always been adequate, it has never particularly impressed me. She is intelligent and can understand things well, but at other times has done a rushed or sloppy job on her work. Overall, I think she would do fine in an independent investigation, but think it would be better to have clear objectives and not be too open-ended.

Is there anything else that you feel a potential advisor should know about this student?

Illinois Mathematics and Science Academy

The World's Leading Teaching and Learning Laboratory for Imagination and Inquiry

Student Inquiry and Research
Recommendation Form

Student Name Colette Vacha graduation year 2017

Recommender Jeong Choe jchoe@imsa.edu
(name) (email)

Recommender: The student listed above wishes to participate in the Student Inquiry and Research (SIR) Program. SIR advisors are frequently requesting additional information so your assistance is needed in recommending and evaluating students. This completed form, as a pdf file, may be sent to off-campus individuals to assist with best placement of students.

1. Please rate the student on each of the following criteria, with 5 being highest and 1 being lowest, based on your experiences with IMSA students.

Criteria	5	4	3	2	1	No basis for judgment
Motivation for the investigation		X				
Intellectual potential		X				
Ability to analyze/problem solve		X				
Teamwork skills	X					
Perseverance		X				
Maturity		X				
Works independently		X				
Communication skills		X				
Integrity		X				
Overall judgment		X				

Please comment on the preparedness of the student to participate in an independent investigation.

Colette did well in SI Chemistry. She is analytical and is good at rationalizing her thought process. She learned a lot about how to improve her study habits while taking this course.

Is there anything else that you feel a potential advisor should know about this student?

No.